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IS 11217 (1984): Ultramarine Blue for Use in Textile Industry [TXD 7: Textile Sizing and Finishing Materials]



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**IS : 11217 - 1984**

( Reaffirmed 2006 )

*Indian Standard*

**SPECIFICATION FOR  
ULTRAMARINE BLUE FOR USE IN  
TEXTILE INDUSTRY**

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**INDIAN STANDARDS INSTITUTION**  
**MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG**  
**NEW DELHI 110002**

# *Indian Standard*

## SPECIFICATION FOR ULTRAMARINE BLUE FOR USE IN TEXTILE INDUSTRY

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(Continued on page 2)

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**IS : 11217 - 1984**

(Continued from page 1)

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*Indian Standard*  
**SPECIFICATION FOR  
ULTRAMARINE BLUE FOR USE IN  
TEXTILE INDUSTRY**

**0. FOREWORD**

**0.1** This Indian Standard was adopted by the Indian Standards Institution on 15 November 1984, after the draft finalized by the Textile Sizing and Finishing Materials Sectional Committee had been approved by the Textile Division Council.

**0.2** Ultramarine blue is used extensively in textile industry as a tinting material. It is also used in laundry industry. Use of ultramarine blue enhances the appearance of white, bleached textiles. Ultramarine blue is also used as pigment for paints, for which a separate Indian Standard has been formulated ( *see* IS : 55-1970\* ).

**0.3** For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960†. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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**1. SCOPE**

**1.1** This standard covers ultramarine blue used as tinting material in textile applications.

**2. REQUIREMENTS**

**2.1 Composition**

**2.1.1** The ultramarine blue shall be a complex of sodium aluminium sulphonate. It shall be dry powder, free from lumps, visible impurities and any foreign matter.

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\*Ultramarine blue for paints (*first revision*).

†Rules for rounding off numerical values (*revised*).

IS : 11217 - 1984

## 2.2 Identification

2.2.1 Warm gently approximately 0.1 g of the material in about 10 ml of 1 : 1 (v/v) hydrochloric acid in a test tube for about 10 minutes. The material shall be ultramarine blue if the colour of the solution is destroyed completely with the evolution of hydrogen sulphide gas. This may be detected by placing lead acetate paper at the mouth of the test tube which turns brown. The presence of any colour in the solution will indicate presence of foreign matter.

2.3 The ultramarine blue shall conform to the requirements given in Table 1 and in 2.4 or 2.4.1.

TABLE 1 REQUIREMENTS OF ULTRAMARINE BLUE

Sl. No.	CHARACTERISTIC	REQUIREMENT	METHOD OF TEST, REF TO CLAUSE NO. IN	
			Appendix	IS : 33-1976*
(1)	(2)	(3)	(4)	(5)
i)	Matter soluble in water, percent, <i>Max</i>	2.0†	—	17 ( Hot or cold method )
ii)	Volatile matter, percent, <i>Max</i>	1.5	—	7
iii)	Residue on IS sieve 63 micron, percent, <i>Max</i> { see IS : 460 ( Part 1 ) - 1978† }	0.8	—	8
iv)	Soluble organic colouring matter:			
	a) 10% acetic acid test b) 4 N NaOH test }	To pass the test	A	—

\*Methods of sampling and test for inorganic pigments and extenders for paints ( *second revision* ).

†Water extract shall be colourless.

‡Test sieves : Part 1 Wire cloth test sieve ( *second revision* ).

2.4 Sealed Sample — If, in order to specify the tint of the ultramarine blue, a sample has been agreed upon between the buyer and the seller and sealed, the supply shall be in conformity with the sample in this respect.



**2.4.1 Reflectance** — Unless otherwise agreed to between the buyer and the seller regarding tint of ultramarine blue, the average colour difference ( $\Delta E$ ) between the tinted and untinted standard cotton cloth when measured in accordance with the method given in Appendix B shall be between 9 and 11.

### 3. PACKING AND MARKING

**3.1 Packing** — The ultramarine blue shall be suitably packed, as agreed to between the buyer and the seller.

**3.2 Marking** — The containers shall be marked with the following:

- a) Name of the material;
- b) The manufacturer's name or trade-mark, if any;
- c) Net mass of the material; and
- d) The lot and the batch number.

**3.2.1** The containers may also be marked with the ISI Certification Mark.

**NOTE** — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

### 4. SAMPLING

**4.1** Representative samples of the material shall be drawn as prescribed under 4 of IS : 33-1976\*.

## APPENDIX A

(Table 1)

### TEST FOR SOLUBLE ORGANIC COLOURING MATTER

#### A-0. GENERAL

**A-0.1** To a boiling solution of the material in ethanol, sodium hydroxide solution and acetic acid are added separately and examined for any development of colour.

\*Methods of sampling and test for inorganic pigments and extenders for paints (second revision).

**IS : 11217 - 1984**

## **A-1. REAGENTS**

**A-1.1 Ethanol** — 35 percent (*v/v*), conforming to IS : 323-1959\*.

**A-1.2 Acetic Acid** — 10 percent (*v/v*).

**A-1.3 Sodium Hydroxide Solution** — Approximately 4 N.

## **A-2. PROCEDURE**

**A-2.1** Add 1 g of ultramarine blue to 100 ml of ethanol in a beaker. Heat the beaker in a hot water bath (preferably electrically heated) and bring the solution to boil.

**NOTE** — No naked flame or hot plate should be used for boiling the material with ethanol in order to avoid hazard.

**A-2.2** Divide the boiling solution into two parts and pour the same in two test tubes. To one of the test tubes add 1 ml of acetic acid. [10 percent (*v/v*)] and to the other test tube add 1 ml of sodium hydroxide solution (4 N). Observe the colour of the liquid in both the test tubes.

**A-2.3** The material shall be deemed to have passed this test if the liquids remain colourless in both the test tubes.

# **A P P E N D I X B**

( *Clause 2.4.1* )

## **METHOD FOR REFLECTANCE TEST OF ULTRAMARINE BLUE**

### **B-1. PRINCIPLE**

**B-1.1** A specimen of a standard cotton cloth is tinted with 0.1 percent (*m/v*) aqueous solution of ultramarine blue. The minimum percent reflectance of the tinted specimen and another untinted specimen of standard cotton cloth is measured by a spectrophotometer selecting suitable wavelength in the region 400-700 nm at an interval of 20 nm and the colour difference is calculated with the help of tristimulus values (*x, y, z*) which in turn may be obtained from the reflectance values ( *see B-5.5* ).

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\*Specification for rectified spirit ( *revised* ).

**B-2. APPARATUS****B-2.1 A Spectrophotometer****B-2.2 An Electric Iron****B-2.3 A Laboratory Scale Padding Mangle****B-3. MATERIALS**

**B-3.1 Standard Cotton Cloth** — It shall be a desized, scoured and bleached cotton cloth conforming to the constructional requirements given in Table 2. The cloth shall be free from any sizing or finishing material and optical brightening agents.

**TABLE 2 CONSTRUCTIONAL DETAILS OF STANDARD COTTON CLOTH**

METHOD OF TEST	COUNT OF YARN TEX (COTTON COUNT)		NUMBER OF THREADS PER dm	
	Warp	Weft	Warp	Weft
	14.0 ± 5% (42 <sup>n</sup> ± 5%)	14.0 ± 5% (42 <sup>n</sup> ± 5%)	390 ± 5% - 2.5%	290 ± 5% - 2.5%
	IS : 3442-1980*	IS : 3442-1980*	IS : 1963-1969†	IS : 1963-1969†

\*Method for determination of crimp and count of yarn removed from fabrics (first revision).

†Method for determination of threads per decimetre in woven fabrics (first revision).

**B-3.2 Glass Wool and Cotton Filter Plugs****B-3.3 Distilled Water** — (See IS : 1070-1977\*).**B-4. PREPARATION OF TEST SPECIMENS**

**B-4.1** Cut two specimens of standard cotton cloth (see B-3.1) each of size 20 cm × 30 cm and iron them to remove wrinkles and creases.

**B-5. PROCEDURE**

**B-5.1** Prepare 0.1 percent (m/v) solution of ultramine blue under test by pasting the required quantity of it with a little distilled water and then

\*Water for general laboratory use (second revision).

IS : 11217 - 1984

making up to the desired volume with warm distilled water. Filter the solution successively through a glass wool and cotton plug.

**B-5.2** Pad one of the test specimen (*see* B-4.1) dry in 0.1 percent (*m/v*) solution of ultramarine blue in a laboratory scale padding mangle and squeeze the padded specimen to 80 percent pick up. Dry the specimen by hanging in air at a temperature not exceeding 60° C.

**B-5.3** Find out the minimum percent reflectance of the tinted specimen as obtained in B-5.2 on a spectrophotometer selecting suitable wavelength in the region 400 nm to 700 nm at an interval of 20 nm at four different places of the specimen and then find out the average of these four readings.

**B-5.4** Find out the average minimum percent reflectance of the untinted test specimen (*see* B-4.1) as described in B-5.3.

**B-5.5** Calculate the colour difference,  $\Delta E$  between the tinted and the untinted test specimens by the formula:

$$\Delta E = [(\Delta L)^2 + (\Delta a)^2 + (\Delta b)^2]^{\frac{1}{2}}$$

where

$$L = 25 \left[ \frac{100 R}{R_0} \right]^{\frac{1}{2}} - 16;$$

$$a = 500 \left[ \left( \frac{X}{X_0} \right)^{\frac{1}{3}} - \left( \frac{R}{R_0} \right)^{\frac{1}{3}} \right], 0 < \frac{R}{R_0} < 1;$$

$$b = 200 \left[ \left( \frac{Y}{Y_0} \right)^{\frac{1}{3}} - \left( \frac{Z}{Z_0} \right)^{\frac{1}{3}} \right];$$

$$\Delta L = L (\text{treated sample}) - L (\text{untreated sample});$$

$$\Delta a = a (\text{treated sample}) - a (\text{untreated sample});$$

$$\Delta b = b (\text{treated sample}) - b (\text{untreated sample});$$

and  $X_0$ ,  $Y_0$ ,  $Z_0$  are the tristimulus values of the white object colour stimulus for illuminant used.

For example:

$$\begin{aligned} \text{for D65, } X_0 &= 95.01943, \\ Y_0 &= 100.00, \text{ and} \\ Z_0 &= 108.84374. \end{aligned}$$

**B-5.6 Report** — Report the sample of ultramarine blue to have passed this test if the value of colour difference,  $\Delta E$  obtained meets the requirements as specified in 2.4.1.

**AMENDMENT NO.1 JANUARY 1993**  
**TO**  
**IS 11217 : 1984 SPECIFICATION FOR ULTRAMARINE**  
**BLUE FOR USE IN TEXTILE INDUSTRY**

( *Page 4, clause 2.3* ) — Substitute the following for the existing clause:

**'2.3 The ultramarine blue shall conform to the requirements given in Table 1 and in 2.4.1.'**

( *Page 5, clause 2.4.1* ) — Substitute the following for the existing clause:

**'2.4.1 The tint of ultramarine blue shall be measured either instrumentally or visually by the methods prescribed in Annex B. When the tint is measured instrumentally, the average colour difference ( $\Delta E$ ) between the tinted and untinted standard cotton cloth shall be between 9 and 11. When the tint is measured visually with the grey scale for evaluating staining the overall average numerical grey scale rating for staining of tinted fabric by at least three experienced graders shall be either 3 or 3-4 or 4 for each specimen tested.'**

( *Page 6, Annex B, heading* ) — Substitute the following for the existing heading:

**'METHOD FOR ASSESSING TINT OF ULTRAMARINE**  
**BLUE'**

( *Page 6, Annex B* ) — Insert the following new clause after B-2.3:

**'B-2.4 Grey scales for evaluating staining.'**

( *Page 7, clause B-5* ) — Substitute the following for the existing clause:

**'B-5 PROCEDURE FOR INSTRUMENTAL ASSESSMENT OF TINT'**

( *Page 8, clause B-5.6* ) — Insert the following new clauses:

**'B-6 PROCEDURE FOR VISUAL ASSESSMENT OF TINT'**

**B-6.1 Follow the procedure given in B-5.1 and B-5.2.**

**B-6.2 Evaluate the numerical rating for staining of the tinted fabric specimen with the help of grey scale for evaluating staining by the method prescribed in IS 769 : 1982 'Method for evaluating staining (*first revision*)'. The assessment of the numerical rating for staining shall be done by at least three experienced graders and the overall average rating shall be reported."**

**( TXD 07 )**

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**Reprography Unit, BIS, New Delhi, India**